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Abstract

Child well-being is analysed in this paper using the capability approach with a special focus on gender differences. The capabilities analysed are senses imagination and thought and play. These are crucial dimensions in the definition of child well-being and the country analysed performs particularly badly, with regards other industrialized countries. We estimate a Structural Equation Model (SEM) where the two capabilities are defined as latent variables which are intrinsically interrelated. For each of these capabilities, a set of indicators of functionings is utilised. The model is applied to Italian data for 2008.

The results imply strong gender differences among Italian children. In particular, highly educated parents invest more in girls' capability of senses imagination and thought than in the boys' capability. On the other hand highly educated parents invest more on their children's play activities the effect being similar for boys and girls. Assuming parents education as a proxy for family income, this confirms the well-known result of higher income elasticities for girls' education (measured here with the capability of senses imagination and thought) with respect to boys education.

JEL: B54, C35, J13, J16

Keywords: capability approach, children well-being, structural equation models.

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Introduction

The relevance for the economy as a whole of children's wellbeing should place children and caring for children at the core of economic analysis (Nancy Folbre 2008). A feminist assessment of wellbeing brings at the forefront gender inequalities and fairness in the gender distribution of care and domestic work (Antonella Picchio 2003; Tindara Addabbo, Marie-Pierre Arrizabalaga, Cristina Borderias and Alastair Owens 2010).

Moreover, children's wellbeing is a broad concept and it may be measured with different methodologies. In this paper, we choose the capability approach to measure some aspects of children's wellbeing. One of the main reason is that Sen's capability approach (Amartya Sen 1985, 1992, 1999) distinguishes between what people are free to do and to be (their 'capabilities') and what they do and are (their 'functionings').[4] In the capability approach, the wellbeing of individuals is evaluated not only in terms of functionings achieved (what people do or are, such as being well-fed or adequately sheltered, for example) but also in terms of the freedom to choose different functionings. Individuals with the same functionings may have different wellbeings because their choice sets (i.e. capabilities) are different. This approach, which gives value to freedom of choice, is what Sen (1992, ch. 4) calls wellbeing freedom, i.e. the freedom to achieve those things that are constitutive of one's wellbeing.[5]

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[4] Among Sen's many publications, the short work "Commodities and Capabilities" (1985) provides a very clear explanation of the definitions of functionings and capabilities. For a survey of the capability approach from a feminist perspective, see the special issue of Feminist Economics, 2003, vol. 9, 2-3.

[5] Note that the concept of wellbeing adopted is very different from subjective indicators of wellbeing in happiness economics (for example in Richard A. Easterlin 2002, Bruno S. Frey and Alois Stutzer 2002). See Sen (1992 ch.s 3 and 4) for a comparison between direct measures of utility (measures of satisfaction or happiness) and the capability approach. Sen argues that:

"*This way of seeing individual advantage is particularly limiting in the presence of entrenched inequalities. In situations of persistent adversity and deprivation, the victims do not go on grieving and grumbling all the time, and may*

Taking our lead from Martha Nussbaum (2003), in order to conceptualize child capabilities, we consider children as subjects. Nevertheless, there are some issues which distinguish child capabilities from adult capabilities. The first issue is that parents' capabilities and functionings influence child capabilities directly or indirectly; another important issue concerns children's freedom. In order to convert capabilities into functionings, children need the approval and the support of their parents; therefore, child conversion factors have more constraints than adult conversion factors (Mario Biggeri, Renato Libanora, Stefano Mariani and Leonardo Menichini 2006).

In the capability literature, there has been increasing concern about how to choose and define capabilities (Ingrid Robeyns 2003, Nussbaum 1999) and children's capabilities in particular. The paper by Mario Biggeri, Jerome Ballet and Flavio Comin (2010) contains a clear and complete review of the literature on the application of the capability approach to children. They distinguish between participatory and non-participatory methods. Non-participatory methods imply the use of primary or secondary data sources for measuring children's capabilities and/or functionings (Shelley Phipps 2002; Tindara Addabbo, Gisella Facchinetti and Gianni Mastroleo 2006; Maria Laura Di Tommaso 2007; Jürgen Volkert and Kirsten Wüst 2011, Maria Laura Di Tommaso and Tindara Addabbo 2011; Anna Maccagnan 2011). Participatory methods imply the direct involvement of children in the identification and measurement of their capabilities (Mario Biggeri, Renato Libanora, Stefano Mariani and Leonardo Menichini 2006, Mario Biggeri, Jerome Ballet and Flavio Comim 2010, 2011).

In this paper we apply a non-participatory method in a gender perspective to the analysis of child wellbeing in Italy by focusing on two capabilities: that of senses, imagination and thought and the

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even lack the motivation to desire a radical change of circumstances (…) It contrasts with the focus on capabilities, which provides a straightforward account of the lack of freedom of the deprived people to achieve those elementary functionings" (Sen 1992, pp. 6-7).

that of play. The reasons for focusing on these two capabilities are analyzed in Section 2. The relevance of focusing on Italy is due to its gender inequality in unpaid care and domestic work (Antonella Picchio 2003; Tindara Addabbo 2003).

As stated by Nancy Folbre and Susan Himmelweit (2000) in their Introduction to the Special Issue of Feminist Economics 'Children and family policy: a feminist issue':

> *"Comparative analysis suggests a remarkable common denominator: the pressure placed on women to maintain their traditional care responsibilities while also increasing their hours of paid work."* (Folbre and Himmelweit 2000, p.1).

This pressure is particularly evident in Italy: though at a much slower pace than in other industrialized countries, the double-earner model is becoming more common and is expected to expand further. However, the increasing involvement of Italian women in paid work does not imply a decrease in hours of unpaid care and domestic work. The female total work load is 10 hours a week higher than men's in double-earner families (Tindara Addabbo, Antonella Caiumi and Anna Maccagnan 2010). Women have therefore 80 minutes per day of leisure time less than men: the largest gender gap in leisure time amongst 18 OECD countries (OECD 2009).

Because capabilities are theoretical constructs which are intrinsically unobservable, in this paper we apply a simple Structural Equation model. In fact, Structural Equation Models are particularly well suited to measuring capabilities because they link latent unobservable variables to observed variables and to measurement errors. These models allow for the use of multiple indicators of the capabilities analyzed, while at the same time they allow us to analyze the effects of some covariates on children's capabilities. A further advantage of this method is that it allows us to take into account and measure interdependency and correlation among the various capabilities.

Section 2. Italian children's wellbeing: the selection of capabilities

Among the various aspects of children's wellbeing, we chose two capabilities: that of 'the senses, imagination and thought' and that of 'play'. We chose these two capabilities because they are particularly relevant for Italian children. In fact, the UNICEF 2007 analysis on the various dimensions of child wellbeing measures six dimensions: material wellbeing, health and safety, educational wellbeing, family and peer relationships, behavior and risks, and subjective wellbeing. Amongst the 21 OECD countries, on the whole Italy obtains an average ranking over the six dimensions, with a better than average rank in the family and peer relationships dimension and a low achievement level in educational wellbeing. Moreover, the OECD Program for International Student Assessment (PISA) shows very low results for Italy compared to other OECD countries, and a high degree of regional variation (Romina Boarini 2009; Fondazione Agnelli 2009, Pasqualino Montanaro 2008)[6]. Compared to other European countries, Italy is also characterized by a higher incidence of adults between 18 and 24 who abandon education without obtaining an upper secondary school diploma. In 2008, the incidence of early school leavers was around 17 percent on average in EU-27 countries (16.9 percent among boys and 12.9 percent among girls) and 19.7 percent in Italy (22.6 percent of boys and 16.7 percent of girls) (Eurostat 2010) against the European target for 2020 of under 10 percent. There are also significant regional differences in the share of early school leavers, with a 25 percent average in the South of Italy (Boarini 2009). Given the prominent role of education in children's cognitive development (Alison Clarke-Stewart and Virginia Allhusen 2005) and the low achievements of Italian children, in this paper we focus on the educational dimension, referring to the capability of "senses, imagination and thought" as defined by Martha Nussbaum:

"Being able to use the senses, to imagine, think, and reason and do these things in a "truly human" way, informed and cultivated by an adequate education, including but by no means limited to, literacy and basic material skills." (Nussbaum 2003, p. 41).

[6] Only 15-year-old children were assessed.

Leisure and playing activities are defined as the 'play capability' in a rather broad sense, in keeping with Martha Nussbaum's definition: *"Being able to laugh, to play, to enjoy recreational activities"* (Nussbaum 2003, p. 42). The role of this capability in defining children's wellbeing is essential. The psychological literature suggests that play represents a channel through which children communicate to others, become aware of the social world, start developing skills and acquiring knowledge (Doris Bergen 1988). There are two important reasons to focus on the measurement of this capability in Italian children. The first concerns child labor. There has been an increased concern for the amount of work performed by Italian children. According to the *Istituto di ricerche economiche e sociali*'s 2008 "Save the Children" survey, in 2006 about 480,000 to 500,000 children aged under 15 were involved in child labour. The Italian National Institute of Statistics' 2000 survey estimates that 14.7 percent of young people between 15 and 18 in Italy had work experience before they were 15 years old (Enrico Moretti 2004). Child labor affects children's wellbeing and limits children's opportunities to devote their time to playing and to education, with lasting effects on the development of their capabilities.

The second reason to analyze the capability to play is that Italy is characterized by one of the lowest fertility rates in the word, with a total fertility rate in 2010 of 1.4 children per woman (ISTAT 2011a). A severe reduction in family size has taken place: according to the Italian National Institute of Statistics data, couples without children increased as a percentage of the total number of families from 17.8 in 1988 to 20.2 percent in 2006-2007, whereas couples with children decreased from 49.4 in 1988 to 38.6 percent in 2006-2007. Households with four members decreased from 23.3 in 1998 to 18.2 percent in 2006-2007 (ISTAT 2010). This implies that most children live in single-child families and this may limit their opportunity to play with their peers in the family. In Section 4 we describe the functionings and indicators of the two capabilities and the dataset in greater depth.

3. The structural equation model

Any attempt to operationalize the capability approach requires an adequate framework for the measurement of the abstract unobservable multidimensional concept. One such attempt is the latent variable approach including principal components, factor analysis and Structural Equation Models (SEMs).[7] The first two models provide estimates of the latent variables but say nothing about the factors influencing such variables (capabilities in our context). SEMs represent a step further in this direction as they include exogenous 'causal' variables for the latent factors. More complex SEM models allow for feedback mechanisms where some of these causal factors not only influence human development but are also influenced by it. Previous papers which utilize Structural Equation Models to estimate wellbeing within a capability framework include: Wiebke Kuklys (2005), Di Tommaso (2007), and Jaya Krishnakumar (2007). The seminal contribution by Kuklys (2005) contains the first theoretical model of capabilities applied to SEMs. Jaya Krishnakumar and Paola Ballon (2008) utilize SEMs to estimate the capability of being educated and adequately sheltered as based on Bolivian data. Di Tommaso (2007) estimates the wellbeing of Indian children defined over the capabilities of bodily health, senses, imagination and thought, and leisure and play.

The principal advantage of this approach is that it does not rely on the exact measurement of capabilities. This is an advantage because capabilities are *per se* latent, unobservable variables. They are a theoretical construct of which we can only observe certain indicators. Each indicator represents a noisy signal of the capability.[8]

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[7] 'Structural' in this models stands for the assumption that the parameters are not just descriptive measures of association but that they reveal an invariant 'causal' relationship. These techniques do not prove causality in the data. At best, they show whether the casual assumptions embedded in a model match a data sample.

[8] This modeling strategy has been extensively used in psychometrics and more recently in econometrics (see for example Maria Laura Di Tommaso, Martin Raiser and Melvyn Weeks 2007), and is founded upon the specification of a system of equations which establishes the relationship between an unobservable latent variable, a set of observable

The SEM approach allows us to think of this model as comprising two parts: two structural equations – one for the capability of senses, imagination and thought and one for the capability of play, which relates the two latent capability variables to the causes – and two measurement equations in which each capability is measured by various indicators.

For each of the indicators chosen to represent a latent construct, a weight (factor loading) will be estimated. This weight represents how much that specific functioning counts in explaining the latent variable relative to other functionings.

In order to estimate the model outlined above, we shall introduce a number of notations.

The measurement part of the model is as follows:

$$\begin{aligned} Y^{I} &= \Lambda^{Y^{I}} Y_1^{*} + \varepsilon_1 \\ Y^{II} &= \Lambda^{Y^{II}} Y_2^{*} + \varepsilon_2 \end{aligned} \qquad (1)$$

where $Y^{I} = \left(Y_1^{I}, Y_2^{I}, Y_3^{I}, ...Y_m^{I}\right)$ is a vector with *m* elements representing an unobserved independent indicator of the senses, imagination and thought capability Y_1^{*}.

$Y^{II} = \left(Y_1^{II}, Y_2^{II}, Y_3^{II}, ...Y_m^{II}\right)$ is a vector with *n* elements representing an unobserved independent indicator of the play capability Y_2^{*}.

$\Lambda^{Y^{I}} = \left\{\Lambda^{Y^{I}}{}_1, \Lambda^{Y^{I}}{}_2, \Lambda^{Y^{I}}{}_3 .....\Lambda^{Y^{I}}{}_m\right\}$ denotes an $m \times 1$ parameter vector of factor loadings, each element representing the expected change in the respective indicators following a one-unit change in the latent variable Y_1^{*}. $\Lambda^{Y^{II}} = \left\{\Lambda^{Y^{II}}{}_1, \Lambda^{Y^{II}}{}_2, \Lambda^{Y^{II}}{}_3 .....\Lambda^{Y^{II}}{}_m\right\}$ denotes an $n \times 1$ parameter vector of factor

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endogenous indicators and a set of observable exogenous variables (which are believed to be the causes of a specific capability).This approach builds upon the early work of Karl Joreskog and Arthur Goldeberger (1975) and Arnold Zellner (1970), and has been formalized in the LISREL (Linear Structural Relationships) model of a set of linear structural equations. An excellent review of the literature is to be found in Peter Bentler and David Weeks (1980); Dennis Aigner, Cheng Hsiao, Arie Kapteyn, and Tom Wansbeek (1984), and Tom Wansbeek and Rik Meijer (2000).

loadings, each element representing the expected change in the respective indicators following a one-unit change in the Y_2^* latent variable.

ε_1 is an $m \times 1$ vector of measurement errors, with Θ_{ε_1} denoting the covariance matrix, and ε_2 is an $n \times 1$ vector of measurement errors, with Θ_{ε_2} denoting the covariance matrix.

Moreover, we let these two capabilities be correlated with a correlation coefficient equal to $\rho_{\varepsilon_1 \varepsilon_2}$

We also outline the structural part of the model. We posit that the latent variables Y_1^* and Y_2^* are linearly determined by a common vector of observable exogenous variables $x = (x_1, x_2, ...x_s)$ and a stochastic error $\varsigma = (\varsigma_1, \varsigma_2)$= giving,

$$\begin{aligned} Y_1^* &= x'\gamma_1 + \varsigma_1 \\ Y_2^* &= x'\gamma_2 + \varsigma_2 \end{aligned} \qquad (2)$$

where γ_1 and γ_2 are $s \times 1$ vectors of parameters.

Examining (1) and (2), we may thus think of our model as comprised of two parts: (2) is the structural equation and (1) is the measurement equation, reflecting the fact that the observed measurements are imperfect indicators. The structural equation specifies the casual relationship between the observed exogenous causes and the two capabilities. Combining (1) and (2), the reduced-form representation may be written as

$$\begin{aligned} Y^I &= \pi_1 x' + v_1 \\ Y^{II} &= \pi_2 x' + v_2 \end{aligned} \qquad (3)$$

where $\pi_1 = \Lambda^{Y^I} \gamma_1^{'}$ is the $m \times s$ reduced-form coefficient matrix for senses, imagination and thought, and $\pi_2 = \Lambda^{Y^{II}} \gamma_2^{'}$ is the $n \times s$ reduced-form coefficient matrix for play. $v_1 = \Lambda^{Y^I} \varsigma_1 + \varepsilon_1$ and $v_2 = \Lambda^{Y^{II}} \varsigma_2 + \varepsilon_2$ are the reduced-form disturbance.

The application of this model to our dataset will allow us to estimate the γ_1 and γ_2 parameters, the factor loadings (weights of each indicator in respective latent variables) Λ^{Y^I} , $\Lambda^{Y^{II}}$, and the $\rho_{\varepsilon_1 \varepsilon_2}$ correlation coefficient.

4. Description of the data and the empirical specification of the model

Because we focus on the capabilities of senses, imagination and thought and the capability to play, we need data both on indicators of the two capabilities and on the factors affecting their development or their conversion into functionings at individual, family and institutional levels. For this purpose, we use a survey released by the Italian National Institute of Statistics: the Multipurpose Survey on Daily Life for the year 2008 (AVQ08). The survey includes a section on children under 17 that contains information on their playing activities, social interaction opportunities, educational achievements, work and other daily activities.

We restrict our analysis to a more homogeneous group of children: those aged six to 10, i.e. of primary school age. In order to analyze the gender impact of parents' characteristics on children's wellbeing, we select households where both parents are present. Single-parent households are excluded also due to the limited number of observations. The resulting sample is based on 1,703 observations (856 girls and 847 boys).

Table 1 describes the functionings indicators of latent capabilities. The indicators for the capability of senses, imagination and thought are the following: attitude towards education, a dummy variable equal to 1 if the child has been attending artistic classes, a dummy variable equal to 1 if the child has been attending other classes, i.e. computer or language classes. The indicators for the play capability are the following: a dummy variable equal 1 if the child has been attending sport classes; a dummy for attending dance courses; dummies for playing with soft toys, for playing "house", videogames, ballgames and role-playing games.

TABLE 1 APPROXIMATELY HERE (half page vertical)

The "attitude towards education" indicator is an ordered categorical variable which takes values from 1 (no effort) to 5 (high effort) The AVQ08 multipurpose survey does not provide information on children's performances at school like the OECD Program for International Student Assessment.[9] The only variable available is attitude towards education reported by parents: a rather imperfect proxy of a child's level of cognitive ability. In addition, the survey collects information on attendance of extra-curricular classes.

Table 2 reports descriptive statistics for the indicators described in table 1. Girls attend more artistic classes than boys and they attend more language and computer classes than boys. Girls' attitude towards education (parents' evaluation) is higher than boys'.

TABLE 2 APPROXIMATELY HERE (half page vertical)

Girls are more likely than boys to attend dance courses, to play role games, to play with soft toys and to play "house"; on the other hand, boys are more engaged than girls in videogames, ballgames and sport activities.

Tables 3 shows the descriptive statistics of the independent variables. We include parents education[10] both as a proxy of household income (not available in the dataset) and as a factor affecting parents investment in children (Petra Todd and Kenneth Wolpin, 2007; Flavio Cunha and James Heckman, 2008). The number of siblings is relevant because, on one hand, it could increase the play capability, but on the other it decreases parents' time and potential investment in each child. Nevertheless, the average number of siblings in the household is about one.

TABLE 3a APPROXIMATELY HERE (third page vertical)

TABLE 3b APPROXIMATELY HERE (half page vertical)

[9] However, PISA provides information only on 15-year-olds' performances at school; it does not provide information on younger children, and it does not provide information on children's other capabilities.

[10] The multipurpose survey on daily life provides information on households' socio-demographic structure, as well as on the education, leisure time, recreation and interaction with relatives and friends of children aged under 18.

There is a wide-ranging literature on the effect of maternal time allocation and employment on children's outcomes showing conflicting results (Jane Waldfogel, Wen-Jui Han and Jeanne Brooks-Gunn 2002; Paul Gregg, Elizabeth Washbrook, Carol Propper and Simon Burgess 2005; Christopher Ruhm 2005, Raquel Bernal 2008). The literature on the effect of paternal employment and allocation of time on children's outcome is more limited (Susan Averett, Lisa Gennetian and Elizabeth Peters 2005, Daniela Del Boca, Christopher Flinn and Matthew Wiswall 2010). Extending the analysis to fathers' time use is also a relevant issue in terms of gender equality policies (Janet Gornick and Marcia Meyers, 2009). Parental time devoted to childcare and playing with children affects child's outcomes, and it is especially relevant given the very low fertility rate in Italy.

Moreover in our dataset, fathers are more engaged than mothers in paid working activities and their amount of unpaid working hours per week is around six against 35 for mothers. This is consistent with evidence on the very unequal distribution of unpaid work by gender in Italy (Addabbo, 2003). From the year 1998 to 2008, fathers' time spent in childcare increased from 28 minutes per day to 47 minutes per day. Over the same period, mothers' time in childcare increased from 62 minutes to 95 minutes per day .[11]

We also include regional dummy variables among the independent variables because of high regional variability in the quality and diffusion of early childcare services and in the opening hours of primary schools (Daniela Del Boca and Silvia Pasqua 2010, Nabanita Datta Gupta and Marianne Simonsen 2010). Unfortunately, we do not have variables regarding attendance of kindergartens in these datasets, and therefore we use regional dummies. Despite the fact that we deal with children attending primary school, the literature shows that attendance of kindergartens matters in terms of attitudes towards education. The quality of childcare services matters particularly for low income

[11] These figures refer to the average number of hours per day that fathers and mothers use on childcare in couples with children in which the woman is employed (ISTAT Multipurpose survey, 1998 and 2008, Istat, 2011b).

households. Italy has a very low rate of public childcare coverage for children under three (Del Boca and Pasqua 2010). With regard to early childcare services, Italy is characterized by a rationing of services for children aged under three, yet with a high degree of regional variability (Francesco Zollino 2008; ISTAT 2010; Raffaella Giordano and Pietro Tommasino 2011). On average in 2008, 10 percent of children under three attended kindergartens, ranging from 24 percent in Emilia Romagna in the North of the country, to 2 percent in Campania and Calabria, located in the South of Italy (ISTAT 2010).

GRAPH 1 APPROXIMATELY HERE (third page vertical)

Primary school, for children aged six to 10, is compulsory in Italy; however, the length of the school day and the type of services provided by the schools are subject to regional variation. There is a high variance across regions in the availability of 'full-time' primary schools whose timetable also covers the afternoon (2 percent in Palermo and 90 percent in Milan).[12] According to our elaboration of the Italian National Institute of Statistics, Multipurpose Survey on Daily Life for the year 2008 (AVQ08), 68 percent of children in the center/north have lunch at school, against 22 percent in the South. The main reason for not having lunch at school in the South is that the service is simply not available.

5. Identification issues, goodness of fit.

The model's parameters are estimated using the Maximum Likelihood method.[13] It is important to note that since latent variables are not directly observable, they have an unknown measurement unit. Therefore, in order to overcome this problem we need to set the metrics of the latent variable.

[12] First Report on School Quality by Tuttoscuola (www.tuttoscuola.com).

[13] We use the Lisrel software.

Two methods are commonly used.[14] The first consists in setting a lambda parameter equal to 1 for each latent variable: hence an observed indicator defines the measurement unit of the latent variable. In SEM terminology, the estimate deriving from this methodology is commonly referred to as an unstandardized solution. The second method consists in standardizing latent variables, setting their variance equal to one. This methodology leads to the so-called standardized solution, which makes it easy to compare coefficients related to variables whose measurement unit is unknown, as we may refer to changes in standard deviations rather than to changes in obscure measurement units. However, in our case, the latter methodology cannot be implemented directly, as it may be carried out only on exogenous latent variables (and this is not the case).[15] Nevertheless, using Lisrel, the standardized solution for endogenous latent variables may be recovered after estimation.

In brief, for the model's identification we need to estimate the unstandardized parameters, which also provide the estimated standard errors and significance level of the coefficients, even though standardized coefficients are more easily comparable. For these reasons we will report both solutions.

Within structural equation modeling, the root mean squared residual (RMR) is a widely used goodness of fit measure. This is defined as the square root of the sum of the squared estimated residuals of the variance-covariance matrix. Obviously, the closer the RMR is to 0, the better the fit. The cutoff for good model fitting is 0.05 (Michael Browne and Robert Cudeck 1993). The RMR measurement reveals an adequate fit for both the boys' and girls' models, as it is 0.040 for the former, and 0.037 for the latter.

6. Results

[14] More details on the two methods may be found in Piergiorgio Corbetta 2002, p. 142 – 143.

[15] The reason for this is that only the variance of exogenous latent variables belongs to the main model parameters.

In this section we present the results of the model in Section 3 estimated on the data of Section 4. Given the gender differences in the descriptive statistics shown in Section 4 and the focus of the paper, we estimate the model separately for boys and girls. Table 4 reports the unstandardized and standardized parameters of the measurement model for boys and girls.

TABLE 4 APPROXIMATELY HERE (half page vertical)

With regard to the cognitive capability, as we can see from the unstandardized coefficients, the selected indicators show statistically significant results. The estimated factor loadings – and in particular their standardized version – suggest that the absolute change in observed functionings that follows a one standard deviation change in the latent cognitive capability is the highest for attitude toward education and the lowest for attendance of other activities. This is true for both boys and girls: it respectively leads to a 0.28 and 0.22 increase in attitude towards education, and to a 0.11 and 0.13 increase in attending other classes.

As far as the play capability is concerned, we find that for both boys and girls the highest factor loadings are for sport activities: a one standard deviation increase in the latent capability increases the functioning for sport activities by 0.26 for boys and 0.27 for girls. The second highest factor loadings for both boys and girls are in role play; the third highest factor loadings being for videogames. For boys, all the functionings have significant coefficients except attendance of dance classes and playing ballgames. For girls, we find that the higher their playing capability, the less they play with soft toys (and dolls).

In the structural part of our model, we study the effect of individual, parental and geographical factors on the development of the capability of senses, imagination and thought and that of play. The results of the structural models are presented in table 5, reporting both unstandardized and standardized solutions for each capability. The latter allows us to interpret more intuitively the

changes in the latent variables that follow a change in exogenous variables. They represent the standard deviation change in the latent capabilities, following one-unit changes in the explanatory variables.

TABLE 5 APPROXIMATELY HERE (full page vertical)

Our results show the existence of important gender differences in the development of the two capabilities.

Capability of senses, imagination and thought

We start by analyzing the first columns of table 5, where we find the capability of senses, imagination and thought by gender. As far as personal characteristics are concerned, the number of siblings has a negative impact both on girls and boys but it is only statistically significant for boys (at 10 percent level). In particular, one more sibling is associated with a 0.10 standard deviation decrease in capability for boys. Age has a positive impact both for girls and boys, but it is more important on boys' cognitive capability than on girls'. Boys experience a statistically significant 0.14 standard deviation increase, while girls experience a 0.12 standard deviation increase, which is statistically significant but only at the 10 percent level.

Among parental characteristics, we find that fathers' and mothers' education are more statistically significant for girls than for boys. In particular, we include two variables on mothers' and two on fathers' educational level among the regressors. The base category is having less than a high school degree. Girls whose father has a university degree have a cognitive level that is a standard deviation of 0.19 higher than girls with a father in the base category. Similarly, in the case of mothers with a high-school diploma, girls' cognitive capability is a 0.18 standard deviation higher than the reference group. For boys, on the other hand, the coefficients of their parents' educational level on child cognitive capability are either not significant, or they are significant only at a 10 percent level. This result indicates a higher influence of family background on girls than on boys.

Furthermore, while mothers' and fathers' hours of paid work hardly have any significant effect on the capability of senses, imagination and thought (as well as mothers' unpaid working time), we find that fathers' higher involvement in unpaid work has a different effect on their children's capabilities according to gender. Unpaid work refers to both domestic and care work. In particular, our results suggest that a weekly hour increase in father's unpaid work is associated with a 0.14 standard deviation increase in boy's cognitive capability.

Finally, because of the peculiarity of the Italian case (as explained in Section 2), we include the area where the family lives among the regressors. We include two dummies (South and Center) among the regressors, keeping the children living in Northern Italy as a reference group.

We do not find any statistically significant effect of living in different areas with regard to the capability of senses, imagination and thought. So despite the uneven distribution of early childcare services and the diverse opening hours of Italian schools, regional differences do not affect this capability.

Capability to play

We now analyze the results for the capability to play (see table 5). Differences by gender are also very relevant to the capability to play. As far as personal characteristics are concerned, we find that the number of siblings does not have any impact on this capability. This could be due to the fact that the average number of children per family is around one. Age has a positive effect only on girls' play activities: a one year increase in age is associated with a 0.22 standard deviation increase in their capability.

Parents' education positively affects children play capability, independently of gender. For example, when mothers have a university degree, boys' and girls' play capability is respectively 0.24 and 0.23 standard deviations higher than in the case of mothers with lower education. This

could be due to the high correlation between education and income. A higher income makes it easier to pay for better recreation in terms of leisure goods and services.[16]

Among the variables related to hours of paid and unpaid work, only fathers' unpaid work has a statistically significant effect on girls: it leads to a 0.12 standard deviation increase in girls' play capability. This effect may also be linked to the higher involvement of fathers in housework games (an important indicator of this capability, as shown in table 4).

Living in the South negatively affects the capability to play: for boys living in the South this is 0.43 standard deviations lower than for boys from the North; similarly for girls, the difference is of about 0.47 standard deviation. Also children living in the Centre are worse off than those from the North, although the difference is not as high and as significant as in the previous case. In Central Italy, girls' playing capability is about a 0.16 standard deviation lower than in the North, while for boys it is a 0.11 standard deviation lower (but this result is significant only at the 10 percent level).

The spread of nursery schools is very uneven in Italy: it is much higher in the North than in the South. It would be interesting to analyze to what extent nursery school attendance could have a positive effect on children's subsequent development. Unfortunately, the data used in our analysis does not allow us to know whether the child attended nursery school when aged under three. The results obtained from the dummies related to area may also partly capture the effect of nursery schools, together with the effects of other institutional factors.

TABLE 6 APPROXIMATELY HERE (fourth page vertical)

[16] These results are different from those of Addabbo and Di Tommaso (2011), in which only fathers' education is shown as statistically significant for the capability to play. However, it must be noted that Addabbo and Di Tommaso worked on a different dataset that also made it possible to disentangle the effects of family income, yet one which did not distinguish between boys and girls.

The two capabilities that we are analyzing are likely to be correlated, as they are affected by the same exogenous variables, and because of unobservable factors driving their development. Table 6 shows the correlation coefficients among the error component of the latent constructs. The correlation coefficient for girls is positive and equal to 0.55. The correlation coefficient for boys is positive and equal to 0.69. They are both highly statistically significant.

7. Conclusions

We analyzed two capabilities for Italian children by gender: the capability of senses, imagination and thought and the capability to play. These two capabilities are particularly relevant in a feminist perspective because they reflect the deep-seated gender discrimination in Italian society. We adopted a structural equation model to estimate the effect of some covariates on both these capabilities. Structural equation models are particularly good for measuring capabilities because they link unobserved constructs (capabilities) to observed covariates (the independent variables). The unobserved theoretical constructs are measured through a set of observed indicators.

Girls on average show higher values in the indicators of senses, imagination and thought than boys. The indicators of the capability to play also show strong differences between boys and girls (see table 2).

As far as the capability of senses, imagination and thought is concerned, our model shows that despite strong gender differences in the descriptive statistics of the indicators used to measure this capability, the ranking by gender of the weights of each indicators are very similar for boys and girls (see tab. 4). In particular, for both boys and girls, attitudes towards education has the highest weight, followed by artistic and other activities. Furthermore (see tab 5), we find that parents' educational levels are more relevant for girls than for boys; given that we use parents' education as a proxy for income (not available in these data), our results could imply that girls cognitive

capability is more sensitive to family income. This confirms the well-known result of higher income elasticities for girls' education compared to boys'.

As far as the capability to play is concerned, we also find that the weights of the indicators have a similar ranking for girls and boys (see tab. 4). For both genders, sports come first, followed by role-playing, videogames and playing "house". Both mothers' and fathers' educational levels are important variables which positively and significantly affect boys' and girls' capability to play, and their impact does not significantly differ by gender.

Another important result is that these two capabilities are highly correlated; this implies that it is important to estimate them simultaneously as we do in this paper. This result also has some relevant policy implications. In terms of education policies aimed at improving children's achievements in education, one also has to take into account children's playing time and activities.

This paper has some drawbacks. Some are due to lack of data, others to the limitations of the model. In terms of data, we would need a dataset that contains better measures of children's school performances. PISA data would contain better data on school performances but they do not have information on the capability to play. We also lack some direct measure of family income. However, the dataset that we use allows us to observe relevant indicators for the play capability, which is found to be correlated to the development of the senses, imagination and thought capability, a correlation that would otherwise not be visible with existing surveys focusing on educational achievements. In terms of the model, it could be interesting to estimate a more complex model to take other capabilities into consideration in order to gain a more complete picture of children's wellbeing.

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Table 1 Description of functionings indicators

Capabilities	**Functionings**	**Description of indicators**
Senses, imagination and thought	*Attitude towards education*	Discrete variables with 5 values: No effort = 1 Studies only favorite subjects =2 Enough effort to pass = 3 Enough effort to pass but can do more = 4 High effort and very good outcome = 5
	Artistic and other activities	Dummy, artistic activities = 1 if the child attends singing, music or theatre courses; 0 otherwise Dummy, other activities (language and computer classes) = 1; 0 otherwise
Play	*Games and sport activities*	Dummy, sport activities = 1 if the child attends sport classes; 0 otherwise Dummy, dance courses = 1 if the child attends dance courses; 0 otherwise Dummy, playing videogames = 1 if videogames are among the child's favourite games; 0 otherwise Dummy, playing ballgames = 1 if ballgames are among the child's favourite games; 0 otherwise Dummy, playing "house" = 1 if playing "house" is among the child's favourite games; 0 otherwise Dummy, roleplay games = 1 if roleplay games are among the child's favourite games; 0 otherwise Dummy, playing with soft toys = 1 if soft toys are among the child's favourite games; 0 otherwise

Table 2 Functionings Indicators: percentages of children by gender. Children aged 6-10 living in two parents households in Italy, 2008 (*N*=1,703)

Senses, imagination and thought	Girls	Boys
Attitude towards education	%	%
No effort	1.8	2.7
Studies only favorite topics	7.6	11.2
Studies to pass	9.1	13.5
Studies to pass but could do more	25.8	36.0
High effort and very good outcome	55.7	36.6
Total	100	100
	%	%
Attendance of artistic classes	15.2	11.6
Attendance of language or computer classes	10.9	9.9
Play		
	%	%
Sport activities	38.4	48.7
Dance course	20.1	1.3
Playing videogames	40.2	71.7
Playing ballgames	21.9	72.4
Playing "house"	38.2	7.2
Roleplay games	30.3	13.0
Playing with soft toys	79.9	11.4
Obs.	856	847

Notes: ISTAT Multipurpose Survey on Daily Life 2008

Table 3a Descriptive statistics of continuous independent variables: children aged 6-10 living in two-parent households in Italy, 2008 (*N*=1,703)

	Minimum		Maximum		Mean		Median		St. Dev.	
	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys
Number of siblings	0	0	5	5	1.11	1.12	1	1	0.74	0.73
Age	6	6	10	10	8.06	8.14	8	8	1.35	1.40
Father's hours of unpaid work	0	0	63	72	6.24	6.25	4	3	8.29	8.96
Father's hours of paid work	0	0	80	80	40.95	41.48	40	40	15.63	14.97
Mother's hours of unpaid work	0	0	98	98	35.02	35.53	35	30	19.49	19.39
Mother's hours of paid work	0	0	72	80	18.48	17.06	19	15	18.43	18.00

Source ISTAT Multipurpose Survey on Daily Life 2008.

Table 3b Descriptive statistics of independent binary variables: children aged 6-10 living in two-parent households in Italy, 2008 (*N*=1,703)

	Girls	Boys
Region of residence:		
North (ref. category)	43.34	38.73
Centre	41.47	45.1
South	15.19	16.17
Mother's educational level:		
University degree	14.89	13.97
High-school diploma	36.04	37.77
Less than high-school diploma (ref. category)	49.07	48.26
Father's educational level:		
University degree	12.01	13.23
High-school diploma	34.57	31.22
Less than high-school diploma (ref. category)	53.42	55.55

Source ISTAT Multipurpose Survey on Daily Life 2008.

Note: "ref. category" indicates the variable used as a reference category in the multivariate analysis.
We distinguish between three levels of education: parents with a university degree, parents with high-school diploma and parents with lower level of education/no education. As regards region of residence, we distinguish between the regions of the North, the Center and South of Italy.

Table 4 The measurement models of the senses, imagination and thought capability, and the capability to play. Boys and girls aged 6-10, 2008.

	Girls		Boys	
	Capability: senses, imagination and thought			
	Unstdized. coeff.	Stdized. coeff.	Unstdized. coeff.	Stdized. coeff.
Attitude towards education	1	0.22	1	0.28
	(0)		(0)	
Dummy artistic activities = 1; 0 otherwise	0.83***	0.18	0.606***	0.17
	(0.23)		(0.15)	
Dummy other activities = 1; 0 otherwise	0.60***	0.13	0.41***	0.11
	(0.17)		(0.10)	
	Capability to play			
	Unstdized. coeff.	Stdized. coeff.	Unstdized. coeff.	Stdized. coeff.
Dummy, sport activities = 1; 0 otherwise	1	0.27	1	0.26
	(0)		(0)	
Dummy, dance courses = 1; 0 otherwise	0.31***	0.08	-0.01	-0.00
	(0.07)		(0.02)	
Dummy, playing videogames = 1; 0 otherwise	0.46***	0.12	0.26***	0.07
	(0.08)		(0.076)	
Dummy, playing ballgames = 1; 0 otherwise	0.26***	0.07	0.08	0.02
	(0.07)		(0.07)	
Dummy, playing "house" = 1; 0 otherwise	0.35***	0.10	0.24***	0.06
	(0.08)		(0.05)	
Dummy, roleplaying = 1; 0 otherwise	0.51***	0.14	0.28***	0.07
	(0.08)		(0.06)	
Dummy, playing with soft toys = 1; 0 otherwise	-0.23***	-0.06	0.20***	0.05
	(0.07)		(0.05)	

Standard errors in parenthesis

* Significant at 10% level; ** Significant at 5% level; *** Significant at 1% level

Table 5 – Structural equation models of the capability of senses, imagination and thought, and of the capability to play. Boys and girls aged 6-10, 2008.

	Senses, imagination and thought				Capability to play			
	Girls		Boys		Girls		Boys	
	Unstdized. coeff.	Stdized. coeff.	Unstdized. coeff.	Stdized. coeff.	Unstdized. coeff.	Stdized. coeff.	Unstdized. coeff.	Stdized. coeff.
Personal characteristics								
Number of siblings	-0.01	-0.04	-0.04*	-0.10	-0.02	-0.06	-0.02	-0.07
	(0.02)		(0.02)		(0.02)		(0.02)	
Child's age	0.02*	0.12	0.03**	0.14	0.04***	0.22	-0.00	0.00
	(0.01)		(0.01)		(0.01)		(0.01)	
Parents' characteristics								
Father's hours of unpaid work	0.00	-0.01	0.01**	0.14	0.00***	0,12	0.00	0.07
	(0.00)		(0.00)		(0.00)		(0.00)	
Father's hours of paid work	-0.00	-0.04	0.00	-0.02	0.00	0.02	0.02	0.07
	(0.00)		(0.00)		(0.00)		(0.00)	
Father's educational level (less than high-school diploma)								
University degree	0.13***	0.19	0.06	0.08	0.12***	0.14	0.10**	0.13
	(0.06)		(0.06)		(0.05)		(0.05)	
High-school diploma	0.06*	0.13	0.08*	0.13	0.09***	0.15	0.11***	0.19
	(0.03)		(0.04)		(0.03)		(0.03)	
Mother's hours of unpaid work	0.000	0.02	-0.00	-0.04	0,00	0,05	0.05	0.11
	(0.00)		(0.00)		(0.00)		(0.00)	
Mother's hours of paid work	-0.00	-0.09	0.00	0.00	0,00	0.04	0.04	0.08
	(0.00)		(0.00)		(0.00)		(0.00)	
Mother's educational level (less than high-school diploma)								
University degree	0.08*	0.12	0.11*	0.14	0.18***	0.23	0.18***	0.24
	(0.05)		(0.06)		(0.05)		(0.05)	
High school diploma	0.08**	0.18	-0.00	-0.00	0.10***	0.18	0.18***	0.32
	(0.04)		(0.01)		(0.03)		(0.03)	
Geographical factors								
(North)								
South	-0.02	-0.04	-0.04	-0.07	-0.26***	-0.47	-0.23***	-0.43
	(0.03)		(0.04)		(0.03)		(0.03)	
Center	0.03	0.06	-0.02	-0.02	-0.12***	-0.159	-0.08*	-0.11
	(0.04)		(0.05)		(0.04)		(0.04)	
R-squared	0.14		0.12		0.42		0.49	
Number of Obs.	856		847		856		847	

Standard errors in parenthesis

* Significant at 10% level; ** Significant at 5% level; *** Significant at 1% level

Table 6 – Correlation coefficient among the latent capability of senses, imagination and thought, and the capability to play. Boys and girls aged 6-10, 2008.

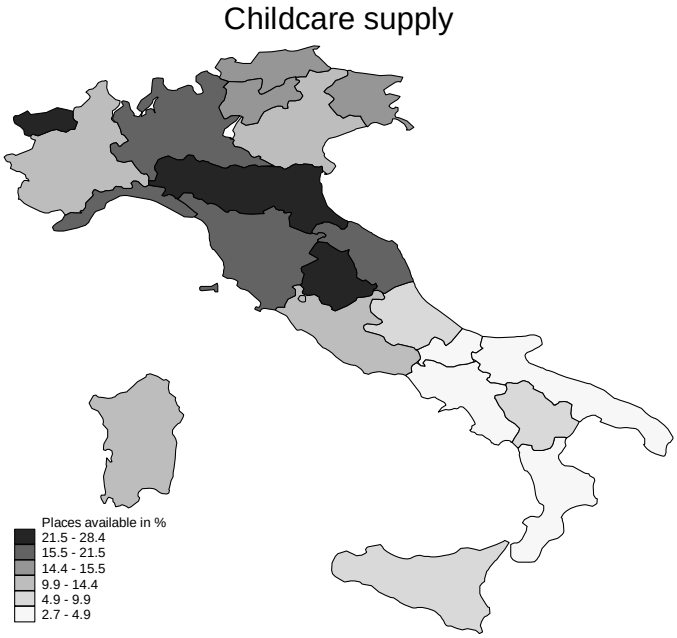
	Girls	Boys
Correlation coefficient among latent variables	0.55***	0.69***
	(0.115)	(0.153)

Standard errors in parenthesis

* Significant at 10% level; ** Significant at 5% level; *** Significant at 1% level

Source: Our elaboration of ISTAT 2008

Figure 1: Percentage of places available in kindergarten (private and public) by Italian region for 0-2 year olds.



Source: Our elaboration on ISTAT (2010)